Sociodemographics of pet ownership among adolescents in Great Britain: findings from the HBSC study in England, Scotland and Wales

Marsa-Sambola, F; Williams, J; Muldoon, J; Lawrence, AB; Connor, M; Roberts, C; Brooks, F; Currie, C

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ABSTRACT

The aim of this study is to assess the prevalence of pet ownership among adolescents in Great Britain and identify any sociodemographic differences between pet owners and non-pet owners. A total of 14328 11- to 15-year-old adolescent from England, Scotland and Wales were included in the analysis. Results revealed 15-year-old adolescents were significantly more likely than 11-year-old adolescents to own dogs (OR=1.146, p<0.001) but less likely to own fish, reptiles or amphibians (OR=0.629, p<0.001), and small mammals (OR=0.630, p=<0.001). 13-year-olds were significantly more likely than 11-year-olds to own dogs (OR=1.240, p=0.021) and birds (OR=1.299, p=0.010), but significantly less likely to own fish, reptiles or amphibians (OR=0.795, p=<0.001). No gender differences were found. White adolescents were more likely than non-white adolescents to own all pet types. Those living in single parents families were significantly more likely than those living with two parents to own dogs (OR=1.186, p=0.013) and cats (OR=1.319, p<0.001). Furthermore, those who reported living in stepfamilies were also more likely to own cats (OR=1.428, p<0.001). Adolescents with siblings were more likely to own cats (OR=1.391, p=<0.001), fish, and reptiles or amphibians (OR=1.220, p=0.037) than adolescents without siblings. Adolescents with employed parents (both or one) were significantly more likely than those with unemployed parents to own dogs (OR=1.414, p=0.002) and birds (OR=1.523, p=0.018). Adolescents from high

affluence families were less likely than adolescents from low affluence families to own dogs (OR=0.888, p=0.037), small mammals (OR=0.832, p=0.005) and birds (OR=0.801, p=0.046). Furthermore, family affluence differences were found in different pet types. Differences in all pets types and siblings were also found in a proxy measure of attachment to pets.

This study provides evidence that pet ownership is related to several sociodemographic factors. These are relevant to take into account when performing HAI studies in adolescents.

Keywords: adolescents, family, pet ownership, socio-demographics, **Great Britain**.

1. Introduction

It is a common phenomenon that children and adolescents live with pets at home and school (Paul & Serpell 1992; **Regan 2011)**. **It has been also described media have an important role in the influence pet ownership has on children and adolescents (Berns 2013)**. **Previous research reports that between 25% and 50% of households in Western societies own pets (Barker et al. 2003; Downes, Canty & More 2009; Murray et al. 2010; Westgarth et al. 2013; Marsa-Sambola et al. 2015).**

Interactions with pets, as an element of Human-Animal Interactions (HAI) has been shown to have positive benefits for general well-being of elderly people (Siegel 1990; Banks & Banks 2002; Cherniack &

Cherniack 2014) and in adult clinical populations (Lane, McNicholas & Collis 1998; Siegel et al. 1999; Allen, Kellegrew & Jaffre 2000; Zimolag & Krupa 2009; Grandgeorge et al. 2012; Hutton 2015). This research often fails to consider the influence that sociodemographic factors may have in explaining these health benefits (Downes, Canty & More 2009; Müllersdorf et al. 2010; Murray et al. 2010; Westgarth et al. 2010). Westgarth et al (2010) therefore argue that there is a need to better understand which sociodemographic factors are associated with ownership of different types of pets in order that these factors can be controlled in study designs and in analysis of data related to HAI.

Previous research conducted with children and adolescents has reported that **HAI** may have some positive benefits in pre-adolescents and adolescents in relation to their socio-emotional development (Covert et al. 1985; Davis & Juhasz 1985; Guttmann, Predovic & Zemanek 1985; Davis 1987; Mader, Hart & Bergin 1989)**.** However, systematic differences may exist in the levels of pet ownership among children and adolescents in terms of sociodemographic variables (Melson 1988; Kidd & Kidd 1990; **Westgarth et al. 2010; Westgarth et al. 2013**). **Previous research has assessed sociodemographic differences in pet ownership as a general measure (Siegel 1995) or considering mainly differences between ownership of dogs and cats among adults (Westgarth et al. 2007; Downes, Canty & More 2009; Murray et al. 2010) and children (Westgarth et al. 2010; Westgarth et al. 2013). It is likely other sociodemographic differences may exist with ownership of other types of pets.**

According to Westgarth et al. (2010) the meaning of the term "pet ownership" may vary across different cultures and countries. In the majority of scientific studies conducted in Western countries in adults, children and young people the main criteria to define pet ownership are related to how the animal is fed , where the pet lives, and whether it is stray, part-owned or free-roaming (Downes, Canty & More 2009; Westgarth et al. 2010). Furthermore Westgarth et al. (2013) suggest the term pet ownership can have a different meaning for adults and children, dependent on who actually owns the animal. For example a pet can live in a household with children and be cared for by children but still be owned by an adult. In line with this, Westgarth et al. (2013) considered pet ownership in children as "living with a pet in the household in which they spent most of their time, or in the case of horses, the child feeling that the horse belonged to their household" (p. 8).

When considering the effects that different types of pets have in children and adolescents' lives, it is vital to consider the importance of attachment to pets (Crawford, Worsham & Swinehart 2006). Research has shown that adults (Friedman, Son & Tsai 2000) and young pet owners (Albert & Bulcroft 1988; Marsa-Sambola et al. 2015) may feel emotionally connected to their pets in a similar way to humans. However, few studies in children and adolescents have assessed the influence of sociodemographic factors on attachment to pets (Westgarth et al. 2013; Marsa-Sambola et al. 2015).

In our study, sociodemographic measures were selected for their **potential relevance** in predicting children's and adolescents' involvement with pets or because sociodemographic measures have been reported in previous research to have some relationship to pet ownership (Levinson 1978; Franti et al. 1980; Kidd & Kidd 1980; Salomon 1981; Cain 1983; Covert et al. 1985; Marx et al. 1988; Melson 1988; Melson & Fogel 1988; Westgarth et al. 2010; Westgarth et al. 2013).

Regarding influences on pet ownership, ethnicity has rarely been investigated (Esposito et al. 2011). According to Westgarth et al. (2013) this factor may have implications throughout the life course in relation to ownership and how children and adolescents perceive pets. The few studies that do exist report that a greater percentage of white adults and teenagers are pet owners, but only in comparison to black ethnic groups (Marx et al.1988; Siegel 1995; Brown 2003). **Few gender differences in pet ownership have been reported in research conducted with children and early adolescents (Siegel 1995; Westgarth et al. 2010; Westgarth et al. 2013). Higher rates of ownership of dogs, cats, rodents, horses and other pets were found among 9- and 10-year-old girls in a study conducted in a deprived area of Liverpool (Westgarth et al. 2013). Similar results were found in a UK Birth Cohort study, where girls reported higher rates of ownership of rabbits, small mammals, and cats (Westgarth et al. 2010).**

The main reason for assessing why pet ownership can be gender related **in adolescents** is because previous studies have reported gender differences in attitudes towards animals. Girls have more positive attitudes towards animals

than boys (Bjerke, Odergardstuen & Kaltenborn 1998), have a higher aesthetic and anthropomorphic orientation **towards animals** (Kellert & Berry 1987), **and higher levels of attachment to pets (Vidovic, Stetic & Bratko 1999; Brown 2003; Marsa-Sambola et al. 2015). While some studies show no gender differences in care-giving activities or attachment to pets owned by young people (Melson 1988; Westgarth et al. 2013), others suggest that gender is a significant influence, particularly within the family context of pet care (Muldoon, Williams & Lawrence, 2014).**

In relation to age, higher levels of pet ownership are said to exist in families with children in middle childhood, between 8- and 12-year-olds (Salomon, 1981; Kidd & Kidd 1985; Melson & Fogel 1989; Paul & Serpell 1992). Others have suggested that pet ownership in general reaches a peak in families with adolescents (Albert & Bulcroft 1988). A decline in pupils' interest in animals with age has been identified, suggesting that 'natural' predispositions may give way to socio-cultural influences (Bjerke, Odergardstuen & Kaltenborn 1998; Prokop & Kubiatko, 2008; **Müllersdorf, Granström & Tillgren 2012).**

Higher levels of **family affluence** and parental employment (both or one parent working) have been linked to higher prevalence of pet ownership **(without specifying pet types) in middle childhood** (Melson 1988; Bryant & Worley 1989). Some studies suggest that **children and early adolescents from** affluent families are more likely to have pets because of the economic costs associated with pet ownership (Franti et al. 1980; Covert et al. 1985; Albert & Bulcroft 1988). **The fact that parents work and therefore spend many hours away from home is a reason for acquiring a pet, as parents may view pets as a companion figure (Fifield & Forsyth 1999). However,**

other studies have found that dog ownership in the general population decreases as years of education or family affluence level increases (Eller et al. 2008; Downes, Canty & More 2009; Murray et al. 2010). Westgarth et al. (2010) found dog ownership in children was associated with higher levels of deprivation.

Family **structure** is also relevant to pet ownership. Paul and Serpell (1992) reported that **children living in** step-parent families were found to have significantly more pets than single-parent families. **Bodsworth and Coleman (2001) found that children in single-parent families attached more strongly with their dog than those in two-parent families. These outcomes are in line with the hypothesis that the attachment between a child and a pet can act as a protective factor for children experiencing inter-parental conflict (Strand 2004).** However, another study conducted by Melson (1988), found that **children living in** two-parent families were more likely to own pets than single-parent families. **Research on this variable is scarce.**

In relation to the effect of siblings **in studies conducted with children**, some authors report that pet ownership **in general** is more common where there are fewer siblings (Covert et al. 1985; Melson 1988; Paul & Serpell1992). These findings have been used by various authors to justify the possible role that pets have as companions or playmates for children (Levinson 1978; Kidd & Kidd 1985). **However, other studies have not found evidence that having dogs, cats, rabbits, rodent, horses or other pets are linked to the presence or number of siblings a child has (Westgarth et al. 2013). The relationship between siblings and pets may be of particular benefit to**

families with adolescents where the family structure has changed, such as in stepfamilies or single parent families (Albert & Bulcroft 1988; **Strand 2004**; **Müllersdorf, Granström & Tillgren 2012**).

Given the relative paucity of studies on the sociodemographics of pet ownership among **adolescents (Covert et al. 1985; Siegel 1995; Bjerke,** Odergardstuen & Kaltenborn **1998; Müllersdorf, Granström & Tillgren 2012)**, we consider it relevant to assess which sociodemographic variables are important in determining pet ownership **of different types of pets, as recent studies have identified sociodemographic differences in different pets types in adults (Eller et al. 2008; Downes, Canty & More 2009; Murray et al. 2010) and children (Westgarth et al. 2010; Westgarth et al. 2013).** Our main aims were to:

(1) Test which sociodemographic characteristics (gender, age, ethnicity, family structure, presence of siblings, parental employment, and family affluence levels) are associated with different types of pet ownership in adolescents.

2) Test which sociodemographic characteristics (gender, age, ethnicity, family structure, presence of siblings, parental employment, family affluence levels and pet types) are associated with a proxy measure of attachment.

2. Methods

Design

Data are from national surveys conducted in 2009/2010 in **England, Scotland and Wales** as part of the Health Behaviour in School-aged Children: WHO Collaborative Cross-National Study (HBSC). The HBSC survey is conducted in member countries (currently 43 in Europe and North America) every four years (Currie et al. 2012). The methods employed in gathering these data are described in detail elsewhere (Currie et al. 2011). Parents gave consent for their children to be part of the survey. Ethics Committees of the University of St Andrews, the University of Hertfordshire, and the University of Swansea approved the protocol. Data collection was anonymous and the demographic information collected did not permit identification of the individual student. The HBSC study uses a self-administered questionnaire, which was designed according to international standards (Roberts et al. 2009). **All member countries are involved in a continuous process of development and validation of the survey.** The survey is administered in a random sample of schools by teachers or researchers to students aged 11, 13 and 15 years old. Each country employed the same sampling strategy following the international protocol of the HBSC Study, which specifies a minimum sample of 1550 for each age group (11-,13- and 15-year-old adolescents)(Currie et al. 2011). Schools were stratified by country and by local authority, to achieve a representative sample of each region.

Sample characteristics

For the purposes of analysis, the data were weighted by country, gender and age. **The weighted sample is shown in Table 1: England (N=4306; 29.8%), Scotland (N=5058; 35%), and Wales (N=5073; 35.2%); Boys (N=7221; 50%), Girls (N=7215; 50%); 11-year-olds(N=4972; 34.4%), 13-year-olds(N=4943; 34.3%) and 15-year-olds(N=4521; 31.3%).**

INSERT TABLE 1 HERE

The majority of those surveyed were **white (N=12206; 86.5%), living with both parents (N=9114; 66.9%), had siblings (N=13336; 92.4%) and with one or both parents employed (N=11675; 95.6%). Further sociodemographic variables are shown in Table 1.**

INSERT TABLE 2 HERE

Measures

The HBSC survey includes multiple sociodemographic and health variables. For this paper, the following demographic measures were included in the analysis: gender (1=male; 2=female), age (1=11-year-old; 2=13-year-old; 3 =15-year-old), ethnicity (1=white; 2=mixed; 3=Asian; 4=black; 5=other), and **family affluence (Family Affluence Scale)**. Due to small numbers and for

statistical purposes, ethnicity data were **collapsed** into white (1=white) and non-white (2=mixed, Asian, black and other).

The Family Affluence Scale (FAS)(Batista-Foguet et al. 2004) was utilised to assess adolescents' absolute socio-economic status based on material markers and is related to commonly used indices of material deprivation (Carstairs & Morris 1990) and home affluence (Wardle, Robb & Johnson 2002). The items include: a) Does your family own a car, van or truck? (no=1, yes, one=2, yes, two or more=3); b) Do you have your own bedroom for yourself? (no=1, yes=2); c) During the past 12 months, how many times did you travel away on holiday with your family? (not at all=1,once=2, twice=3, more than twice=4); d) How many computers does your family own? (none=1, one=2, two=3. More than two=4). For our analysis, a composite FAS score was calculated (tertile classification). **FAS has been recoded in previous research to create low, middle and high family affluence groups in order to examine the effect of relative or approximate SES position that more easily corresponds with classical SES groupings (Griesbach, Amos & Currie 2003; Holstein et al. 2004; Due et al., 2005; Vereecken et al., 2005; Boyce et al. 2006; Richter, Lepping & Gabhain 2006; Richter & Leppin, 2007; Currie et al. 2008).**

The following items were also chosen to gather information about adolescents' family structure and parental employment: "Who lives with you in the home where you spend most of the time?" (mother=1, father=2, stepmother=3, stepfather=4, other=5); "How many siblings do you have?" (none=0, one=1, two=2, three or more=3); "Does your father have a job?" (yes=1, no=2, don´t know=3, don´t have or see father=4); "Does your mother

have a job?" (yes=1, no=2, don´t know= 3, don´t have or see mother=4). Answers from the question "Who lives with you in the home where you spend most of the time?" were re-coded into three categories for statistical purposes (single-parent family=1, both parents=2, stepfamilies=3). Furthermore, the two questions related to parental employment were collapsed into a single variable with two categories: both or one parent employed=1 and no parents employed=0.

Finally, the following pet ownership questions were included: "How many pet animals do you have now?" (none=1, one=2, two=3, more than two=4); "What type of pet animal(s) do you have now?" **(I don't have a pet at the moment=0**, dogs=1, cats=2, small mammals=3, fish, reptiles or amphibians= 4, birds=5 and others=6); "Do you have a pet that you think of as your own?" (yes=1, no=0). **For statistical purposes, the first two questions were recoded as follows: "How many pets do you have now?" (None=0, one=1, two or more=2); "What type of pet animal(s) do you have now?"(dogs=Yes(1)/No(0), cats=Yes(1)/No(0), small mammals=Yes(1)/ No(0), fish, reptiles or amphibians=Yes(1)/No(0), birds=Yes(1)/No(0).**

The item "Do you have a pet that you think of as your own?" was used as a proxy measure of attachment to pets. In a previous study, this item was associated with a measure of attachment to pets (Marsa-Sambola et al.2015).

Items to assess pet ownership were developed by Muldoon and Williams (2010) during the early stages of a study designed to examine how to best promote a duty of care towards animals among children and young

people. Two small-scale empirical studies were carried out with children and young people in order to: inform the development of a school-based intervention and assess the utility/suitability of items/measures developed in the US context for UK-based children and young people. The first of these was qualitative; a series of focus groups that explored children's relationships with their pets and their perceptions of the ways in which they were cared for within the family (see Muldoon, Williams & Lawrence 2014). The second study involved a small survey (n=121) investigating the links between attitudes, attachment and empathy (Williams, Muldoon & Lawrence 2010). Together, these two studies provided an ideal opportunity to scope the possibility of developing items for assessing pet ownership (Muldoon & Williams 2010) and a succinct scale of attachment to pets published elsewhere (Muldoon & Williams 2010; Marsa-Sambola et al. 2015).

In our study, according to our previous pilot studies, the interpretation of whether an animal was a pet lay with the survey participants (adolescents), although a list of common animals considered pets was provided. The word "own" was not employed in the item "What types of pet animals do you have now?"in order to avoid confusion in some participants. Adolescents could live with a pet that was considered "owned" by a different family member. Furthermore, the Item "Do you have a pet that you think of as your own?" was also developed through our pilot studies, where children distinguished between pets that were theirs vs. those of their parents or siblings. It showed where children

had a strong connection to a particular pet, so we used it here as a proxy measure of attachment

Statistical analyses

Percentages for each **sociodemographic variable**, pet ownership and types of pets were computed for **England, Scotland and Wales** using the Statistical Package for Social Sciences Version 21 for Windows (SPSS 2012). Percentages were calculated on actual responses.

Six multivariable binary logistic regression models of factors associated with the ownership of: dogs; cats; fish, reptiles or amphibians; birds and small mammals were tested. Five multivariable models were based on the item "What type of pet-animal do you have now?" with the following responses: dogs (Yes/No); cats (Yes/No); fish, reptiles or amphibians (Yes/No); birds (Yes/No) and small mammals (Yes/No). Each multivariable model was performed to predict the odds of a "Yes" response for each animal type by contrast with a "No" response, based on gender, age, ethnicity, family structure, presence of siblings, parental employment and family affluence (FAS). As we were not able to identify specific pet types for category other pets, this was not analysed.

The last multivariable model was based on the item "Do you have a pet you think of as your own?" with the following responses: Yes/No. This model was performed to predict the odds of a "Yes" response by contrast with a "No" response, based on gender, age, ethnicity, family structure, presence of siblings, parental employment, family affluence (FAS) and pet types.

3. Results

Pet ownership characteristics for the total sample

Of the total sample, **9644(72%)** reported that they currently owned a pet. Of those, **7932 (55.8%)** felt they had a pet of their own. Regarding the number of pets owned, **3433 (25.6%)** owned one pet and **6211 (46.4%)** owned two or more pets. The most common pet among adolescents who had only one was a **dog (N=1955, 56.94%)** followed by a **cat (N= 805, 23.48%)** and then **small mammals (N= 278, 8.09%).** In the case of those who **owned two or more pets,** the most common combinations were **dog and cat (N= 1502, 22.18%), dog and fish, reptile or amphibian (N= 803, 12.92%) and cat and small mammals (n=702, 11.30%) (see Tables 1 and 2).**

-INSERT TABLES 1 & 2 HERE-

***Sociodemographic** variation in pet ownership*

According to Westgarth et al. (2010) multivariable modelling of pet ownership data better accounts for confounding socio-demographic factors than univariate analyses, so this section presents six multivariable models with dichotomous outcomes of factors associated with the ownership of: dogs; cats; fish, reptiles or amphibians; birds; and small mammals reported.

Dogs

The multivariable model of pet dog is presented in Table 3, alongside univariable outcomes for comparison. Adolescents were more likely to report having pet dogs if they: were age 15 (OR=1.146, p<0.001) and age 13 (OR=1.240, p<0.001) compared to age 11; were white (OR=7.712, p<0.001) compared to non-white adolescents; reported living with single parents (OR=1.186, p=0.013) compared to adolescents living with both parents; parents were employed (OR=1.414, p<0.001) compared to those who were not; and reported a medium family affluence level (OR=1.151, p=0.012) compared to those who reported a low family affluence level. Furthermore, those who reported a higher family affluence level were less likely to report owning pets (OR=0.888, p=0.037) compared to those who reported a low family affluence level.

-INSERT TABLE 3 HERE-

Cats

The multivariable model of pet cat is presented in Table 4, alongside univariable results for comparison. Adolescents were more likely to report having pet cats if they: were white (OR=4.160, p<0.001) compared to non-white adolescents; reported living in single parent families (OR=1.319, p<0.001) or stepfamilies (OR=1.428, p<0.001) compared to

those who reported living with both parents; and reported to have siblings (OR=1.391, p<0.001) compared to those who did not have siblings. Furthermore, those who reported a medium family affluence level were less likely to report having a cat than those who reported a low family affluence level (OR=0.883, p=0.024).

-INSERT TABLE 4 HERE-

Fish, reptiles or amphibians

The multivariable model of pet fish, reptiles or amphibians is presented in Table 5, alongside univariable outcomes for comparison. Adolescents were more likely to report having pet fish, reptiles or amphibians if they: were white (OR=2.695, p<0.001) compared to non-white adolescents; reported living with siblings (OR=1.220, p=0.037) compared to those who did not report living with siblings; and reported a medium family affluence level (OR=1.318, p<0.001) compared to those who reported a low family affluence level. Furthermore, adolescents were less likely to report owning fish, reptiles or amphibians if they were age 13 (OR=0.795, p<0.001) and age 15 (OR=0.629, p<0.001) compared to those who were age 11.

-INSERT TABLE 5 HERE-

Small mammals

The multivariable model of small mammal pets is presented in Table 6, alongside univariable outcomes for comparison. Adolescents were more likely to report having small mammals if they were white (OR=5.956, p<0.001) compared to non-white adolescents. Therefore, adolescents were less likely to report having small mammals if they were 15-years-old (OR=0.630, p<0.001) compared to those who were 11-years-old; and reported a higher family affluence level (OR=0.832, p=0.005) compared to those who reported lower family affluence level.

-INSERT TABLE 6 HERE-

Birds

The multivariable model of pet bird is presented in Table 7, alongside univariate results for comparison. Adolescents were more likely to report having birds if they: were 13-years-old (OR=1.299, p=0.010) compared to those who were 11-years-old; were white (OR=3.229, p<0.001) compared to those who were non-white; and reported their parents were employed (OR=1.523, p=0.018) compared to those who reported their parents were not employed. Furthermore, adolescents were less likely to report owning birds if they reported a medium (OR=

0.806, p=0.037) or higher family affluence level (OR=0.801, p=0.046) compared to those who reported a low family affluence level.

-INSERT TABLE 7 HERE-

Proxy measure of attachment to pets "Consider their pet as their own"

The multivariable model of variable "consider pet as own" is presented in Table 8, alongside univariable results for comparison. Adolescents were more likely to report considering their pet as their own if they: reported living with siblings (OR=1.998, p<0.001) compared to those who reported they were not living with siblings and owning dogs (OR=2.171, p<0.001), cats (OR=1.869, p<0.001), fish, amphibian or reptiles (OR=2.255, p<0.001) and birds (OR=1.667, p<0.001) compared to those who reported owning small mammals.

-INSERT TABLE 8 HERE-

4. Discussion

Data from our study confirm that pet ownership is commonplace with 72% of families with 11- to 15-year-old adolescents in **Great Britain reporting**

having at least one pet. Our findings are similar to previous studies conducted in the **UK, Germany and Australia** that have shown **different sociodemographic factors associated with childhood and adolescents ownership for different types of pets** (Paul & Serpell 1992; **Headey & Grabka 2007; Westgarth et al. 2010; Müllersdorf, Granström & Tillgren2012;** Westgarth et al. 2013).

Descriptive results from our study provide sociodemographic data taking into account the number of pets owned and animal type. **Of the adolescents who reported having only one pet (25.6%), the most common was the dog (56.94%) followed by the cat (23.48%). In those** cases where adolescents reported having two or more pets, dogs and cats were owned in combination with other pets. Our data confirm the high prevalence of dogs and cats in **English, Scottish and Welsh** households (**Murray et al. 2010; PMFA 2013**; Westgarth et al. 2013). We also found a lower prevalence of small mammals, fish, reptiles and amphibians, and birds among adolescents who reported owning only one animal, but a high prevalence of these three broad types of pet in combination with cats and dogs**. Our results provide a detailed description of the various pet combinations that exist in households in England, Scotland and Wales with adolescents.**

Murray et al. (2010) and Westgarth et al. (2010) argue that different pet types may be associated with different sociodemographic variables (gender, age, ethnicity, family structure, siblings, parental employment, family affluence levels), and the finding reported here support this view.

No gender differences were found for all pets types. This is in line with previous research (Siegel, 1995; Vidovic, Stetic & Bratko 1999) but disagrees with the evidence that girls are more likely than boys to own dogs, cats, rodents and horses (Westgarth et al. 2013). Methodological differences between previous research and our study may help to clarify the lack of agreement in results. According to Paul and Serpell (1992) and Headey, Na & Zheng (2008), due to the fact that family structures may have both girls and boys, gender differences can be complicated when assessing family pet ownership overall (**Müllersdorf et al. 2010; Müllersdorf, Granström & Tillgren 2012**).

Regarding age, we found that 15-year-olds were more likely to own dogs and less likely to own fish, reptiles or amphibians, and small mammals than 11-year-olds. Furthermore, we also found that 13-year-olds were more likely to own dogs, birds and less likely to own fish, reptiles or amphibians than 11-year-olds. These results partially support previous findings from research with children and young people (Salomon 1981; Kidd & Kidd 1985; Melson 1988; Siegel 1995; **Müllersdorf et al. 2010**)**. We believe this could be related with the types of activities adolescents may have with their pets. Adolescents in mid-adolescence may be mature enough to engage in outdoor activities with their pet dogs whereas early adolescents may be more interested in indoor activities at home with their fish, small mammals and birds.**

Our analyses of ethnicity were limited given the small sample sizes of the different ethnic groups. However, we observed **ethnicity was the single most significant factor affecting pet ownership**. White adolescents were

much more likely to own all types of pets than non-white adolescents (Mixed, Asian, Black and children from other ethnicities). This finding supports previous studies conducted in the United States, **assessing pet ownership** among 12-to 17-year-old adolescents (Siegel 1995) **and** university students (Brown 2003). The findings also support research conducted in the UK that considered different types of pets **(dogs, rodents and other pets) in 9- to 10-year-olds**(Westgarth et al. 2013). Different religious and cultural conventions and beliefs are likely to shape the ways in which children and adolescents perceive and treat animals **(Westgarthet al. 2013**). Therefore, future studies are needed to assess which factors are related to pet ownership within different ethnic groups. Ethnicity is also clearly an issue that needs to be taken account of in any school based intervention aimed at improving attitudes and behaviour to animals in young people.

The assessment of family structure has shown that adolescents living in stepfamilies or with a single parent are more likely to own **dogs (only in single parents families) and cats** in comparison with adolescents who live with both parents**.** Accordingly, our findings conflict with Melson (1988), Kidd and Kidd (1990), and Fifield and Forsyth (1999). **However,** it **partially** concurs with Paul and Serpell's (1992) and **Müllersdorf et al.'s (2010) studies. Both studies** stated that stepparents tend to give pets to their sons or daughters to help them to adapt to the new family structure and to reduce feelings of loneliness. We argue that this may also apply to adolescents living with single parents, given that our data shows that **both groups** are also more likely to own **cats and dogs** in comparison with adolescents who live with both parents. **Furthermore, our study found no differences according**

to family structure in ownership of fish, reptiles or amphibians, birds and small mammals. This may be explained by the fact that behavioural and emotional interactions with pets such as inviting to sit pets on laps could be more likely to occur in cats and dogs, rather than with fish, reptiles, amphibians, birds, or small mammals.

In relation to the presence of siblings, some studies suggest that larger families are more likely to have pets (Messent & Horsfield 1985; McHarg et al. 1995), while others point out that single children are more likely to own pets (Rost & Hartmann 1994) or that there is no difference (Melson 1988; Siegel 1995; Westgarth et al. 2013). **We found adolescents with siblings were more likely to own cats and fish, reptile or amphibians.** Melson (1988) suggests that younger children may use pets to express feelings and show behaviours that older children are able to direct towards their younger siblings, although given our sample, we were not able to study this aspect.

The results illustrate a relationship between parental employment and ownership of dogs and birds in families with 13 and 15 year old adolescents, perhaps reflecting the economic expense associated with having a pet (Covert et al. 1985**;** Albert & Bulcroft 1988**; ASPCA 2012).** Our results also partially agree with Melson (1988) and Fifield and Forsyth (1999)**.** These authors state that parents who spend less time with their sons or daughters because of their jobs, could perceive an emotional deficit within their children's environment and consider that a pet **(without specifying any type of pet in particular)** may partially compensate for their absence**.** However, another and complementary explanation could be that working parents may see pet ownership as a possible learning source and as a source

of attachment**.** These parents may consider their **adolescents** adequately independent and responsible enough to care for a **bird or a dog**, particularly if the adolescent-pet interactions are likely to happen without the supervision of parents.

Analysis of the Family Affluence Scale (FAS) revealed that family affluence levels were associated with different types of pets. Adolescents who reported medium family affluence levels were more likely to own dogs in comparison to those who reported lower family affluence levels. Furthermore, we also found adolescents who reported higher family affluence levels were less likely to own dogs. This agrees with other studies that dog ownership decreases as social class or educational levels increases among adults (Downes, Canti & More2009; Eller et al. 2009; Murray et al. 2010) and children (Westgarth et al. 2010; Westgarth et al. 2013). Cat ownership was associated with medium levels of family affluence. This outcome is difficult to compare with previous research conducted in children (Westgarth et al. 2010; Westgarth et al. 2013) and in the general population (Murray et al. 2010). due to methodological differences. Westgarth et al. (2010) reported cat ownership was associated with higher levels of family affluence levels only when education levels interacted with previous experiences of pet ownership during mothers' childhood. Westgarth et al. (2013) reported no differences in the deprivation score used in their study to assess the relationship between family affluence and the ownership of cats. However, in the general population outcomes from Murray et al. (2010)

found to be similar to Westgarth et al.´s study (2010) , higher levels of education were related to cat ownership.

Adolescents who reported medium family affluence levels were more likely to own fish and less likely to own birds in comparison to those from less affluent families. Furthermore, we also found adolescents with high family affluence levels were less likely to own small mammals and birds. This is partially in line with Westgarth et al´s study (2010), which found the likelihood of bird and rodent ownership decreased with higher maternal educational level and increased only for bird ownership with unskilled occupations reported by parents.

Results for fish, reptiles or amphibians are unique and cannot be compared with previous research. The only study examining socio-demographic variables related to fish ownership did not report the results model due to a low goodness of fit in their model (Hosmer-Lemeshow test=0.006) (Westgarth et al. 2010).

Overall, differences between the sociodemographic findings reported here and previous research may be explained by the use of different measures used to assess family affluence, such as the deprivation score scale (Westgarth et al. 2013), parental education, and types of skilled professions reported by parents (Westgarth et al. 2010). Further studies are necessary using a standard and reliable measure of family affluence such as the Family Affluence Scale (Batista-Foguet et al. 2004) to properly assess associations between different types of pets and family affluence levels. Furthermore, studies should consider the

influence that breeds of different types of pets, and the associated costs, may have in this association. Previous research already considered breeds in relation to dog ownership (Westgarth et al. 2013)

Finally, we found that those adolescents who reported owning dogs, cats, fish, reptiles, amphibians and birds were more likely than those who did not, to consider their pet as their own. This fits with the fact that through experience of living with pets, adolescents could become more emotionally connected to their pet animal than those adolescents who do not live with pets, or do not have a pet they consider to be their own (Kotrschal 2013). Research has shown that pet owners tend to feel connected to their pets in a similar way to human relationships (Albert & Bulcroft 1988; Friedmann, Son & Tsai 2000; Marsa-Sambola et al. 2015). Undergraduate students in Kurdek's study (2008) evaluated their level of attachment to their dogs as similar to their family members. As stated by Zilcha-Mano, Mikulincer & Shaver (2011) pets can be accepting, openly affectionate, consistent, loyal and honest. Characteristics that suggest pets may act as attachment figures (Zilcha-Mano, Mikulincer & Shaver 2011; Kotrschal 2013).

Furthermore, we found that adolescents with no siblings were more likely to consider their pets as their own than those who reported having siblings. This is in line with the observation of Siegel (1995) and Westgarth et al. (2013) who suggested that adolescents without siblings assessed their relationship with their pets as more important than those who reported living with siblings. No other sociodemographic

differences were found in our proxy measure of attachment to pets. Although we present some data on sense of owning one's own pet, this variable is a proxy measure of attachment to pets. We were not able to measure attachment to pets in Wales and so we did not include it in this analysis. Data using a pet attachment measure (the Short Attachment to Pets Scale, SAPS) in England and Scotland is published elsewhere (Marsa-Sambola et al. 2015). Future research should replicate our study using SAPS or a similar pet attachment measure to explore sociodemographic influences on emotional attachment to pets among adolescents.

Despite the interesting outcomes obtained through six multivariable binary logistic regression models in a large and not convenience-based sample there are some limitations to consider. First, the data are self-reported, so we did not see the different pet types for confirmation, nor did we check with parents. Second, Items "What types of pet animals do you have now?", "How many pet animals do you have now?" and "Do you have a pet that you think of as your own?" were developed and adapted from previous studies with adolescents (Muldoon & Williams, 2009). However, in line with Westgarth et al. (2013), we acknowledge there is scope to refine the term pet ownership for future research to ensure adolescents' perspectives on pets, mainly considering where pets live and adolescents' sense of ownership feelings towards their pets.

Third, the majority of our variables (gender, ethnicity, family affluence, siblings and proxy measure of attachment to pets) were compared with

the only two studies conducted in the UK on pet ownership in children (Westgarth et al. 2010; Westgarth et al. 2013). There are limitations associated with these studies that need to be considered. Westgarth et al.'s (2013) study was conducted with 9 to 10-year-old children in a region of Liverpool that has areas of high deprivation. Accordingly, it may not be possible to generalize their findings to other populations within Great Britain. Regarding Westgarth et al.'s (2010) study, we would like to highlight that the age range of children involved in this study was from 0 to 10 years, whereas in our study, participants ranged from 11 to 15 years. Fourth, the pet type "fish, reptile or amphibian" was created as a category for exotic pets according to the British Veterinary Association (2012). However, we acknowledge analysing these three pets types separetly may lead to different findings from our current results.

5. Conclusion

Sociodemographic data associated with different types of pets in adolescents are important in order to form a better understanding of the **socio-developmental** impact of growing up with pets.

This study reveals that **different types** of pet ownership in **Great Britain** are related to some **sociodemographic factors.** There are predictable social and economic differences in adolescents who own pets and who therefore have the opportunity of experiencing this form of human-animal relationship.**These factors should be considered when studying positive health benefits of HAI in adolescents**.

Competing interests

The authors declare not competing interests

Acknowledgments

This study presents findings from the first stage of a three-year project ("*An investigation of 13-17 year olds' attitudes and behaviour to animals and development and testing of interventions to promote the concept of Duty of Care"* -SMDO-ZGLD15) that aims to ascertain the most effective ways to promote a duty of care (DOC) towards animals among children and young people. The project was instigated by a call from the Department for Environment Food and Rural Affairs (DEFRA) for research in this area in line with recent changes in animal welfare law.

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Table 1.Characteristics of the sample.

Variable	N(%)	Variable	N(%)
Country		FAS	4858(33.7)
England	4306(29.8)	Low Fas	4711(32.6)
Scotland	5058(35)	Medium FAS	4867(33.7)
Wales	5073(35.2)	High FAS	
Gender		Pet Ownership	
Girls	7215(50)	Yes	9644(72)
Boys	7221(50)	No	3752(28)
Age		Number of pets	
11	4972(34.4)	None	3752(28)
13	4943(34.3)	One	3433(25.6)
15	4521(31.3)	Two or more	6211(46.4)
Ethnicity		Consider pet as their own	
White	12206(86.5)	Yes	7392(55.8)
Non-white	1909(13.5)	No	5849(44.2)
Mixed	381(2.7)	Families	
Asian	951(6.7)	Stepfamilies	1794(13.2)
Black	451(3.1)	Single Parents	2708(19.9)
Other	126(0.9)	Both Parents	9114(66.9)
Siblings		Parent´s employment	
No	1098(7.6)	Employed	11675(95.6)
Yes	13336(92.4)	Non employed	532(4.4)

Table 2. Characteristics of pet ownership

Pet ownership (Combinations)	N(%)
1 pet	
Dog	1955(56.94)
Cat	805(23.48)
Small Mammal	278(8.09)
Fish, reptiles and amphibians	233(6.78)
Bird	90(2.62)
Others	72(2.09)
2 or more pets	
Dog and Cat	1502(24.18)
Cat and Small Mammal	702(11.30)
Small Mammal and Bird	431(6.94)
Dogs and Fish, reptiles and amphibians	803(12.92)
Cat and Fish, reptiles and amphibians	434(6.98)
Dog and Bird	275(4.42)
Bird and Fish, reptiles and amphibians	87(1.40)
Dog and other	184(2.96)
Cat and other	114(1.83)
Bird and other	1(0.01)
Bird and cat	47(0.75)
Dog, Cat and Small Mammal	252(4.05)
Cat, Small Mammal and Fish, reptiles and amphibians	181(2.91)
Dog, Cat and other	160(2.57)
Dog, Cat and bird	114(1.83)
Dog, Cat and Fish, reptiles and amphibians	543(8.74)
Cat, Small Mammal, Fish, reptiles and amphibians and Bird	59(0.94)
Small Mammal, Fish, reptiles and amphibians and Bird	67(1.19)
Small Mammal, Cat, Dog and other	56(0.90)
Bird, Cat, Dog and Small Mammal	39(0.62)
Bird, Fish, reptiles and amphibians and Other	81(1.30)
Cat, Small Mammal, Fish, reptiles and amphibians, Bird, Other	6(0.09)
Bird, Cat, Dog, Small Mammal and Fish, reptiles and amphibians	73(1.17)

Table 3. Multivariable binary logistic regression model of dog ownership

Variables	Dogs					
			Univariable Analyses		Multivariable Analyses	
	No	Yes	**OR(95%CI)**	**P val**	OR(95%CI)	P val
Gender						
Girl	2826(49.5)	2879(50.1)	**1**		1	
Boy	2871(49.8)	2890(50.2)	**0.988(0.918-1.063)**	**0.747**	0.685(0.901-1.071)	0.689
Age						
11	2124(54.0)	1808(46.0)	**1**		1	
13	1933(48.6)	2048(51.4)	**1.244(1.139-1.359)**	**<0.001**	1.240(1.113-1.381)	<0.001
15	1640(46.2)	1912(53.8)	**1.369(1.250-1.500)**	**<0.001**	1.146(1.0321.273)	<0.001
Ethnicity						
Non-white	1453(85.1)	254(14.9)	**1**		1	
White	4020(42.5)	5434(57.5)	**7.721(6.717-8.875)**	**<0.001**	7.712(6.582-9.036)	<0.001
Family structure						
Mother and father	3575(50.3)	3538(49.7)	**1**		1	
Single parents	1075(49.6)	1093(50.4)	**1.363(1.218-1.525)**	**<0.001**	1.186(1.037-1.356)	0.013
Stepfamilies	641(42.6)	864(57.4)	**1.028(0.933-1.131)**	**0.579**	1.095(0.969-1.238)	0.145
Siblings						
No siblings	306(39.4)	471(60.6)	**1**		1	
Siblings	5390(50.4)	5296(49.6)	**0.638(0.550-0.740)**	**<0.001**	0.866(0.727-1.032)	0.108
Parental employment						
No	196 (43.4)	255(56.6)	**1**		1	
Yes	4487(48.7)	4733(51.3)	**1.234(1.020-1.493)**	**0.030**	1.414(1.133-1.764)	0.002
FAS						
Low FAS	1913(50.2)	1898(49.8)	**1**		1	
Medium FAS	2084(54.8)	1722(45.2)	**1.274(1.165-1.394)**	**<0.001**	1.151(1.032-1.284)	0.012
High FAS	1700(44.2)	2149(55.8)	**0.832(0.761-0.911)**	**<0.001**	0.888(0.795-0.993)	0.037

Hosmer-Lemeshow=0.543, n=11466

Table 4. Multivariable binary logistic regression model of cat ownership

Variables	Cats					
			Univariable Analyses		Multivariable Analyses	
	No	Yes	OR(95%CI)	**P val**	OR(95%CI)	P val
Gender						
Girl	3505(66.6)	1755(33.4)	**1**		1	
Boy	3503(65.8)	1822(34.2)	**0.963(0.888-1.044)**	**0.359**	0.955(0.871-1.048)	0.332
Age						
11	2496(67.9)	1182(32.1)	**1**		1	
13	2410(65.4)	1273(34.6)	**1.126(1.019-1.245)**	**0.020**	1.040(0.930-1.162)	0.493
15	2102(65.2)	1122(34.8)	**1.114(1.011-1.228)**	**0.029**	1.052(0.938-1.180)	0.387
Ethnicity						
Non-white	5288(61.6)	3301(38.4)	**1**		1	
White	1475(87.1)	218(12.9)	**4.233(3.648-4.913)**	**<0.001**	4.160(3.563-4.858)	<0.001
Family structure						
Mother and father	4438(68.4)	2052(31.6)	**1**		1	
Single parents	1258(60.7)	816(39.3)	**1.403(1.266-1.554)**	**<0.001**	1.319(1.166-1.491)	<0.001
Stepfamilies	836(59.9)	560(40.1)	**1.448(1.286-1.631)**	**<0.001**	1.428(1.279-1.593)	<0.001
Siblings						
No siblings	390(55.5)	313(44.5)	**1**		1	
Siblings	6615(67.0)	3263(33.0)	**1.465(1.354-1.546)**	**<0.001**	1.391(1.182-1.636)	<0.001
Parental employment						
No	291(69.0)	131(31)	**1**		1	
Yes	5521(65.1)	2960(34.9)	**0.838(0.678-1.035)**	**0.100**	0.855(0.678-1.079)	0.188
FAS						
Low FAS	2347(65.7)	1225(34.3)	**1**		1	
Medium FAS	2448(69.2)	1087(30.8)	**0.851(0.770-0.940)**	**<0.001**	0.883(0.793-0.984)	0.024
High FAS	2213(63.6)	1265(36.4)	**1.095(0.993-1.207)**	**0.069**	1.048(0.942-1.166)	0.391

Hosmer-Lemeshow=0.211, n=10585

Table 5. Multivariable binary logistic regression model of fish, amphibian or reptile ownership

Variables			Fish, amphibian or reptile			
			Univariable Analyses		Multivariable Analyses	
	No	Yes	**OR(95%CI)**	**P val**	OR(95%CI)	P val
Gender						
Girl	3611(70.10)	1542(29.90)	**1**		1	
Boy	3673(70.20)	1557(29.80)	**0.992(0.912-1.079)**	**0.856**	0.995(0.905-1.093)	0.910
Age						
11	2463(66.90)	1217(33.10)	**1**		1	
13	2508(69.80)	1087(30.20)	**0.877(0.794-0.968)**	**0.009**	0.795(0.711-0.899)	<0.001
15	2312(74.40)	796(25.60)	**0.697(0.627-0.775)**	**<0.001**	0.629(0.559-0.709)	<0.001
Ethnicity						
Non-White	1449(85.50)	246(14.50)	**1**		1	
White	5594(66.70)	2794(33.30)	**2.942(2.551-3.393)**	**<0.001**	2.695(2.303-3.155)	<0.001
Family structure						
Mother and father	4437(68.70)	2024(31.30)	**1**		1	
Single parents	1449(73.70)	517(26.30)	**1.067(0.941-1.210)**	**0.311**	1.027(0.888-1.189)	0.718
Stepfamilies	901(67.30)	439(32.70)	**0.783(0.699-0.877)**	**<0.001**	0.882(0.769-1.010)	0.069
Siblings						
No siblings	447(65.70)	233(34.30)	**1**		1	
Siblings	6835(70.50)	2866(29.50)	**1.245(1.057-1.467)**	**0.009**	1.220(1.012-1.471)	0.037
Parental employment						
No	286(66.80)	140(33.20)	**1**		1	
Yes	5726(68.70)	2607(31.30)	**1.093(0.888-1.346)**	**0.401**	1.200(0.954-1.510)	0.120
FAS						
Low FAS	2507(72.00)	975(28.00)	**1**		1	
Medium FAS	2578(74.60)	876(25.40)	**1.459(1.318-1.615)**	**<0.001**	1.318(1.170-1.4840	<0.001
High FAS	2199(63.80)	1248(36.20)	**0.873(0.785-0.972)**	**0.013**	0.898(0.794-1.016)	0.088

Hosmer-Lemeshow=0.943, n=10383

Table 6. Multivariable binary logistic regression model of small mammal ownership

Variables			Small mammals			
			Univariable Analyses		Multivariable Analyses	
	No	Yes	**OR(95%CI)**	**P val**	OR(95%CI)	P val
Gender						
Girl	3812(75.2)	1260(24.8)	**1**		1	
Boy	3874(74.6)	1321(25.4)	**0.969(0.887-1.060)**	**0.495**	0.980(0.886-1.085)	0.706
Age						
11	2617(71.9)	1023(28.1)	**1**		1	
13	2633(73.8)	934(26.2)	**0.907(0.817-1.006)**	**0.065**	0.891(0.792-1.003)	0.057
15	2436(79.6)	624(20.4)	**0.655(0.584-0.734)**	**<0.001**	0.630(0.554-0.716)	<0.001
Ethnicity						
Non-White	1565(93.4)	110(6.6)	**1**		1	
White	5863(70.7)	2429(29.3)	**5.880(4.820-7.173)**	**<0.001**	5.956(4.762-7.448)	<0.001
Family structure						
Mother and father	4735(74.2)	1646(25.8)	**1**		1	
Single parents	1457(74.4)	501(25.6)	**0.982(0.857-1.126)**	**0.866**	1.008(0.875-1.162)	0.909
Stepfamilies	972(74.5)	332(25.5)	**0.990(0.882-1.112)**	**0.798**	0.940(0.802-1.102)	0.444
Siblings						
No siblings	474(73.3)	173(26.7)	**1**		1	
Siblings	7211(75.0)	2408(25.0)	**0.917(0.765-1.098)**	**0.345**	0.937(0.761-1.155)	0.531
Parental employment						
No	301(73.5)	108(26.5)	**1**		1	
Yes	6081(74.0)	2138(26.0)	**1.024(0.817-1.282)**	**0.840**	1.095(0.854-1.405)	0.480
FAS						
Low FAS	2545(74.5)	872(25.5)	**1**		1	
Medium FAS	2713(78.4)	748(21.6)	**1.156(1.038-1.286)**	**0.008**	1.062(0.939-1.201)	0.336
High FAS	2427(71.6)	961(28.4)	**0.805(0.720-0.900)**	**<0.001**	0.832(0.730-0.947)	0.005

Hosmer-Lemeshow=0.900, n=10267

Table 7. Multivariable binary logistic regression model of bird ownership

Variables	Bird ownership					
			Univariable Analyses		Multivariable Analyses	
	No	Yes	**OR(95%CI)**	**P val**	OR(95%CI)	P val
Gender						
Girl	4433(92.1)	378(7.9)	**1**		1	
Boy	4437(92.2)	376(7.8)	**1.006(0.867-1.168)**	**0.935**	1.028(0.870-1.215)	0.747
Age						
11	3121(93.0)	237(7.0)	**1**		1	
13	3052(90.9)	306(9.1)	**1.323(1.109-1.579)**	**0.002**	1.299(1.065-1.585)	0.010
15	2696(92.7)	211(7.3)	**1.031(0.850-1.250)**	**0.757**	0.953(0.767-1.185)	0.667
Ethnicity						
Non-White	1620(97.1)	48(2.9)	**1**		1	
White	6968(91.0)	687(9.0)	**3.347(2.484-4.511)**	**<0.001**	3.229(2.326-4.483)	<0.001
Family structure						
Mother and father	5466(92.1)	471(7.9)	**1**		1	
Single parents	1712(92.6)	138(7.4)	**0.933(0.766-1.137)**	**0.494**	0.953(0.738-1.231)	0.713
Stepfamilies	1140(91.8)	102(8.2)	**1.038(0.831-1.298)**	**0.092**	0.810(0.635-1.032)	0.089
Siblings						
No siblings	555(92.4)	46(7.6)	**1**		1	
Siblings	8312(92.2)	708(7.8)	**0.965(0.707-1.318)**	**0.825**	0.898(0.630-1.280)	0.552
Parental employment						
No	345(87.8)	48(12.2)	**1**		1	
Yes	7081(92.2)	599(7.8)	**1.643(1.201-2.248)**	**0.002**	1.523(1.075-2.159)	0.018
FAS						
Low FAS	2964(91.2)	288(8.8)	**1**		1	
Medium FAS	3018(93.2)	219(6.8)	**0.749(0.624-0.900)**	**0.002**	0.806(0.653-0.996)	0.037
High FAS	2887(92.1)	247(7.9)	**0.881(0.738-1.052)**	**0.163**	0.801(0.651-.987)	0.046

Hosmer-Lemeshow=0.531, n=9624

Table 8. Multivariable binary logistic regression model of consider one own pet.

Variables			Consider pet as their own			
			Univariable Analyses		Multivariable Analyses	
	No	Yes	**OR(95%CI)**	**P val**	OR(95%CI)	P val
Gender						
Girl	3750(55.0)	3070(45.0)	**1**		1	
Boy	4330(57.4)	3210(42.6)	**1.108(1.035-1.187)**	**0.003**	1.043(0.947-1.148)	0.364
Age						
11	2905(60.4)	1908(39.6)	**1**		1	
13	2875(56.9)	2180(43.1)	**1.169(1.075-1.272)**	**<0.001**	1.344(0.191-1.517)	0.500
15	2177(51.0)	2095(49.0)	**1.448(1.329-1.577)**	**<0.001**	1.153(0.025-1.295)	0.918
Ethnicity						
Non-White	518(31.9)	1106(68.1)	**1**		1	
White	7427(59.5)	5063(40.5)	**0.313(0.281-0.350)**	**<0.001**	0.836(0.686-1.020)	0.076
Family structure						
Mother and father	4967(53.6)	4301(46.4)	**1**		1	
Single parents	1645(61.0)	1052(39.0)	**0.736(0.672-0.806)**	**<0.001**	0.909(0.783-1.056)	0.401
Stepfamilies	1119(61.8)	691(38.2)	**0.697(0.626-0.775)**	**<0.001**	1.762(0.662-1.877)	0.702
Siblings						
No siblings	771(64.9)	417(35.1)	**1**		1	
Siblings	7314(55.5)	5867(44.5)	**1.502(1.317-1.712)**	**<0.001**	1.998(1.625-2.457)	<0.001
Parental employment						
No	307(60.1)	204(39.9)	**1**		1	
Yes	6690(56.0)	5263(44.0)	**0.847(0.704-1.019)**	**0.079**	0.785(0.604-1.021)	0.125
FAS						
Low FAS	2690(53.2)	2362(46.8)	**1**		1	
Medium FAS	2391(57.4)	1774(42.6)	**1.835(0.766-0.911)**	**<0.001**	1.875(0.777-1.985)	0.665
High FAS	3004(58.3)	2150(41.7)	**1.819(0.755-0.889)**	**<0.001**	1.873(0.770-1.991)	0.286
Pet types						
Small mammals	2262(81.5)	513(18.5)	**1**		1	
Dogs	1903(68.3)	883(31.7)	**2.046(1.806-2.318)**	**<0.001**	2.171(1.891-2.493)	<0.001
Cats	1569(71.2)	635(28.8)	**1.785(1.562-2.038)**	**<0.001**	1.869(1.612-2.166)	<0.001
Fish	1449(67.4)	700(32.6)	**2.130(1.867-2.430)**	**<0.001**	2.255(1.952-2.606)	<0.001
Bird	353(71.5)	141(28.5)	**1.761(1.417-2.189)**	**<0.001**	1.667(1.302-2.134)	<0.001

Hosmer-Lemeshow=0.386, n=14360